Report Date: 30 Apr 2012

Summary Report for Individual Task
551-8ST-8115
Operate An Emergency Generator
Status: Approved

Condition: Aboard a vessel, at sea, at anchor or moored alongside the pier, day or night, under all sea and weather conditions, operate an emergency generator for maintenance or power failure.

Standard: Perform the necessarychecks and operate the emergency generator IAW TM 55-1915-200, TM 55-1905-223-10, TM 55-1905-223-24-4, TM 55-1925-273-10-1, TM 55-1925-273-10-2.

Special Condition: None

Special Standards: None

Special Equipment:

Safety Level: Medium

MOPP:

Task Statements

Cue: None

DANGER

None

WARNING

None

CAUTION

None

Remarks: None

Notes: None

Performance Steps

1. Perform pre-operational inspections.

a. Inspect the emergency switchboard exterior for damage, or missing circuits, meters, controls, and lights.

b. Inspect the battery charger for proper connections to batteries.

Note: Ammeter should read 0 for trickle charge. A high reading indicates batteries are being charged and may need attention. Refer to batteries maintenance procedure.

c. Inspect the battery box for damage and verify that the vents are not obstructed.

d. Inspect the emergency diesel generator (EDG) batteries.

(1) Inspect batteries, terminals, connection cables, and vent caps for cleanliness and tightness.

(2) Clean and tighten all caps and terminals as required.

(3) Remove caps to check electrolyte levels/specific gravity. Add water if needed.

Note: Some batteries are maintenance-free; however, they still need to be checked for cleanliness and proper terminal connection torque.

e. Inspect the fuel day tank.

(1) Inspect for leaks.

(2) Check the fuel level using the attached sight glass.

f. Inspect the engine accessories and connections.

(1) Inspect the engine, fuel system, cooling system, and lubrication system for loose or damaged connections or mountings.

(2) Inspect fluid lines and joints for leaks.

(3) Inspect the engine for loose, broken, or missing belts, fittings, or guards.

(4) Check the engine oil level while the engine is stopped. (The level should be between the ADD and FULL marks on the dipstick.)

(5) Check the radiator coolant level for proper level.

(6) Check the radiator intake and exhaust louvers for obstructions.

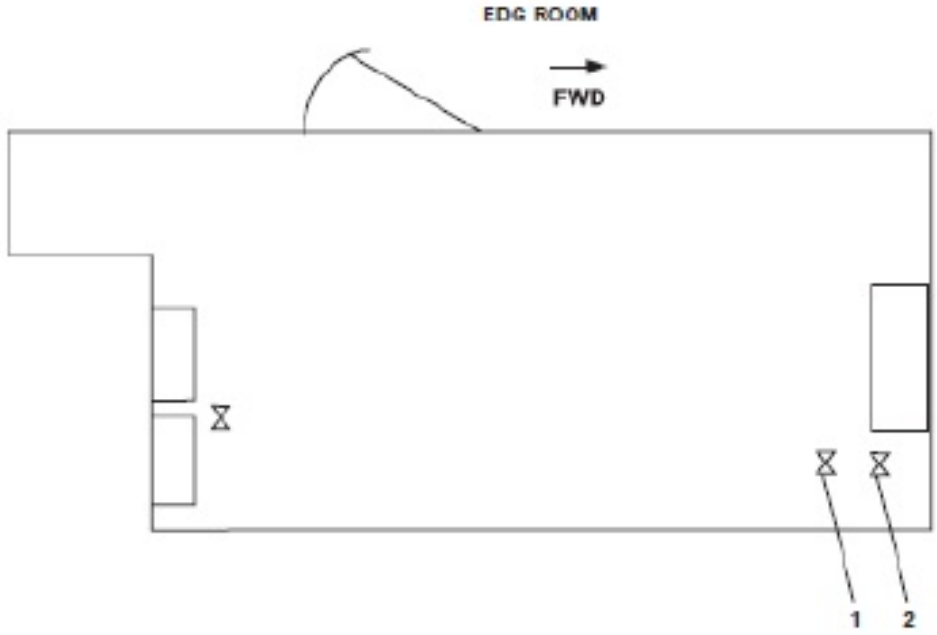
g. Inspect the load center for secure mounting and obvious damage.

2. Align the emergency diesel generator (EDG) for automatic or manual start.

a. Automatic alignment.

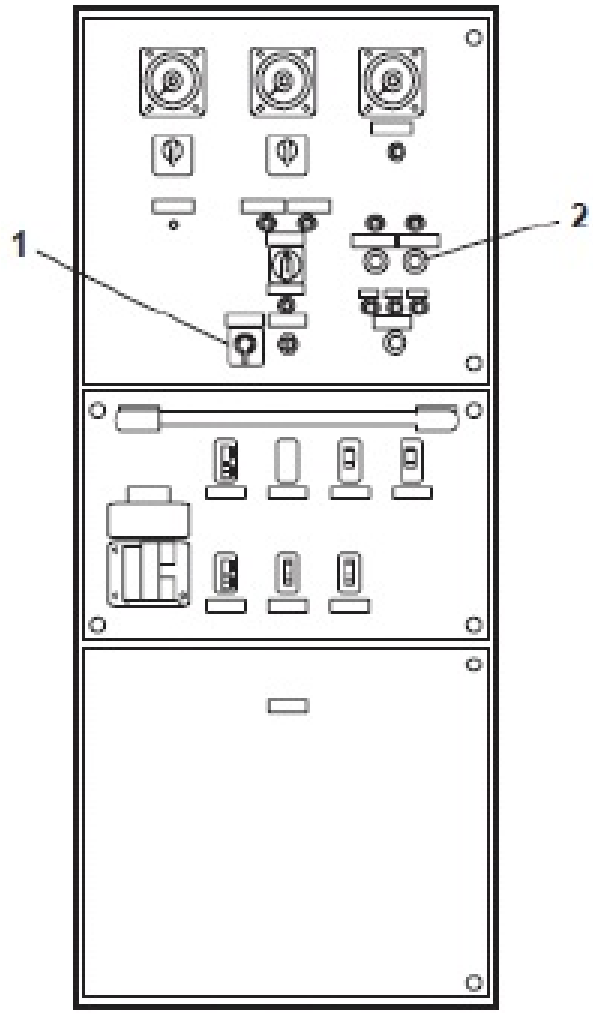
Note: Ensure that fuel valves for SPLY TO ENG, and fuel valves to E.D.G. Day TK FILL, located in the emergency diesel generator room, are OPEN.

(1) In the emergency diesel generator room overhead outboard, open fuel valves SPLY TO ENG (Supply to Engine)(Figure 551-8ST-8115_01, Item 1) and fuel valves to DAY
TK FILL (Day Tank Fill)(Figure 551-8ST-8115_01, Item 2).



Emergency Diesel Generator Fuel Valves
Figure 551-8ST-8115_01

(2) At the emergency switchboard in the emergency diesel generator room, set the
ENG. CONTROL SW (Engine Control Switch)(Figure 551-8ST-8115_02, Item 1) to the AUTO position.

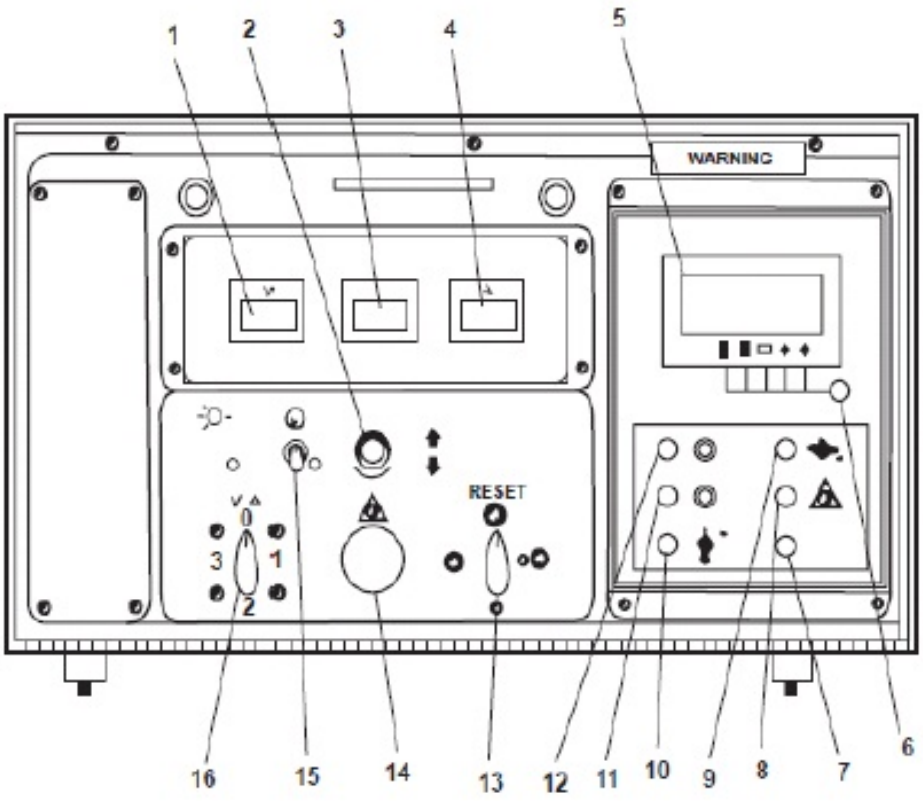


Emergency Switchboard
Figure 551-8ST-8115_02

(3) At the emergency diesel generator control panel in the emergency diesel generator room (Figure 551-8ST-8115_03), complete the following actions:

(a) Turn the red START/STOP pushbutton (Item 14) clockwise to release the pushbutton to the OUT position to complete the starting circuit.

(b) Set the RESET control switch (Item 13) to AUTO START.



Emergency Diesel Generator Control Panel
Figure 551-8ST-8115_03

b. Manual alignment.

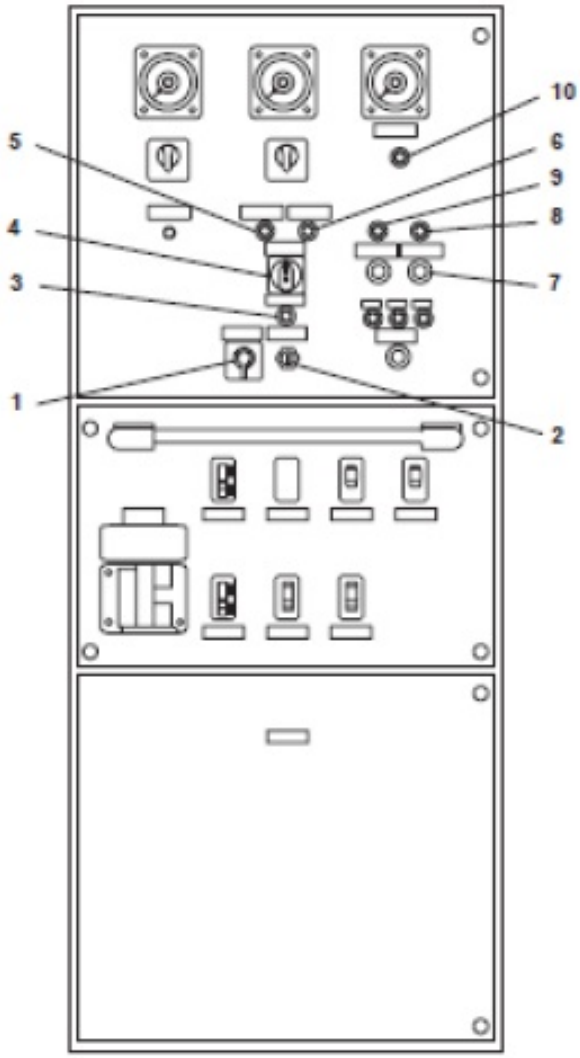
(1) Open fuel valves SPLY TO ENG (Figure 551-8ST-8115_01, Item 1) and fuel valves to E.D.G. DAY TK FILL (Figure 551-8ST-8115_01, Item 2) to line up the fuel system and allow the engine to take suction from and return to the EDG day tank.

(2) Prime the fuel oil system on the engine. If necessary, use the engine mounted hand pump.

Note: Either battery bank 1 or 2 may be used to start the EDG. Both battery banks are continuously charged.

(3) Set the emergency switchboard control switch (Figure 551-8ST-8115_04, Item 1) to HAND.

(4) On the EDG control panel (Figure 551-8ST-8115_03), release the EMERGENCY STOP (Item 14) and turn the RESET control switch (Item 13) to RESET.



Emergency Switchboard
Figure 551-8ST-8115_04

(5) Start the engine by turning the engine control switch (Figure 551-8ST-8115_04, Item 1) to ENGINE START.

Note: All Figures for aligning the emergency diesel generator for automatic or manual start, are shown from a Large Tug. Other vessels maybe slightly different; see vessels Technical Manuals for variations.

3. Start the emergency generator.

Note: Automatic start of the EDG is immediate when the SSDG has failed. If automatic starting of the EDG has failed, the system can be engaged by a qualified member onboard the vessel for manual start.

a. Start the emergency generator on the Logistic Support Vessel (LSV).

(1) Verify that the fuel supply and return lines are open.

(2) Push or turn the green start push button, start switch, or designated start switch.

(3) Engage the Emergency Shipboard Switchboard for shop service.

b. Start the emergency generator on the Landing Craft Utility (LCU).

(1) Place the emergency generator Run-Off-Auto switch to the Auto position.

(2) Pull out the Emergency Stop push button switch.

(3) Place the Emergency Switchboard Mode Switch to the Test position.

Note: This will open the PO201 (Main S.B. Bus Tie breaker), while also starting the emergency generator and energizing the emergency switchboard.

c. Start the emergency generator on the Large Tug(LT).

(1) Automatic start.

(a) Verify that the engine and jacket water cooling levels are at the proper operating levels.

(b) Open valve F0-32 to line-up the fuel system and allow the engine to take suction from and return to the EDG day tank.

(c) Prime fuel oil system on engine, if necessary, with engine mounted hand pump.

(d) Ensure the battery charger is energized and batteries are charged. Either battery bank 1 or 2 may be used; both are continuously charged.

(e) Set the emergency switchboard engine control switch to HAND.

(f) Release the emergency switchboard engine control switch to HAND.

(g) Place the model switch to the AUTO position.

(h) See the switchboard operating instructions for automatic start sequence.

(2) Manual start:

(a) Verify that the engine and jacket water cooling levels are at the proper operating levels.

(b) Open valve F0-32 to line-up the fuel system and allow the engine to take suction from and return to the EDG day tank.

(c) Prime fuel oil system on engine (if needed) with engine mounted hand pump.

(d) Ensure the battery charger is energized and batteries are charged. Either battery bank 1 or 2 may be used; both are continuously charged.

(e) Set the emergency switchboard engine control switch to HAND.

(f) Release the emergency switchboard engine control switch to HAND.

(g) Start the engine by turning the panel switch to engine START.

(h) After the engine starts, observe the local instrumentation to verify proper engine operation.

(i) Allow the engine to warm up until all temperatures/pressures have stabilized.

(j) See the switchboard operating instructions for placing generators on-line.

(k) Remove the load to secure the engine (see switchboard operating instructions).

(l) Allow temperatures to cool 3-5 minutes if the engine has been under load.

(3) Place the engine mode switch in the STOP position.

4. Run the emergency generator.

a. Run the emergency generator on the LSV.

Note: In the event of the Ship's Service Diesel Generators (SSDGs) failing, the EDG will start and go online automatically to provide back-up power to the ship's emergency services. Automatic start of the EDG is immediate when the SSDG has failed. Power distribution is approximately 45 seconds after the EDG has started. Batteries throughout the vessel power critical systems during the 45 second delay.

b. Run the emergency generator on the LCU.

DANGER

DO NOT MISTAKE A COMMON RAILED FUEL SYSTEM EDG (E.G., CATERPILLAR 4.4 ON THE LCU 2006) FOR A COMMON PUMP AND LINES LOW PRESSURE FUEL SYSTEM. THE COMMON RAILED ENGINE IS AN EXTREMELY HIGH PRESSURE FUEL SYSTEM THAT MUST NOT BE CRACKED OPEN AT ANYTIME THAT THE ENGINE IS BEING CRANKED OR IN OPERATION. SEVERE INJURY OR DEATH COULD RESULT.

WARNING

USE EXTREME CAUTION WHEN SERVICING ENGINES THAT ARE OF COMMON RAILED DESIGN (E.G., CATERPILLAR 4.4 LTR, C7/C9, CUMMINS, DETROIT DEISEL, VOLVO, AND OTHERS). ANY ENGINE BUILT IN 1996 TO PRESENT IS SUBJECT TO THIS TYPE OF DESIGN SYSTEM. LOOK FOR COMMON RAILED NOMENCLATURE ON THE OPERATING INSTRUCTIONS OR INVESTIGATE THOROUGHLY BEFORE PERFORMING MAINTENANCE ON THE ENGINE FUEL SYSTEM.

CAUTION

IF A COMMON RAILED FUEL SYSTEM IS AIR BOUND, FIND AND FIX THE PROBLEM BEFORE CONSIDERING BLEEDING.

-If at any time a fuel line is removed it is recommended that the line be replaced, due to the extreme risk involved with the HP system.

-The fuel system produces at the pump 45,000 to 50,000 PSI at all times. This pressure is throughout all lines and fittings in the fuel system on the pump outlet side. The pump is sufficient to push all air out while cranking and the engine will start without cracking any fuel lines.

-If the engine does not start then look for a cause other than cracking lines.

-Do NOT feel around lines for leaks while the engine is starting or in operation. When the engine has come to a rest or has stopped operating, then visually look and feel for wet spots along the lines and look for fuel pooling in areas on the engine topside. If fuel is found, repair must be performed before engine can be operated.

c. Run the emergency diesel generator on the LT.

(1) Manually run the Emergency Diesel Generator (EDG).

(a) Open the Main Bus Tie Breaker.

Note: For pushbutton operation of the motorized Main Bus Tie Breaker, the mode switch must be in the “HAND” or “AUTO” position, and the door on the breaker must be closed.

(b) Close the EDG breaker.

(2) Place the EDG in standby mode.

(a) Place the MOED switch to the AUTO position.

(b) Place the EDG engine control switch to AUTO START (see operating instructions).

(c) Verify that the EDG engine is setup for a STAND BY operation (see operating instructions).

(d) Open the loss of power from the main switchboard

(3) Place the EDG in feedback mode.

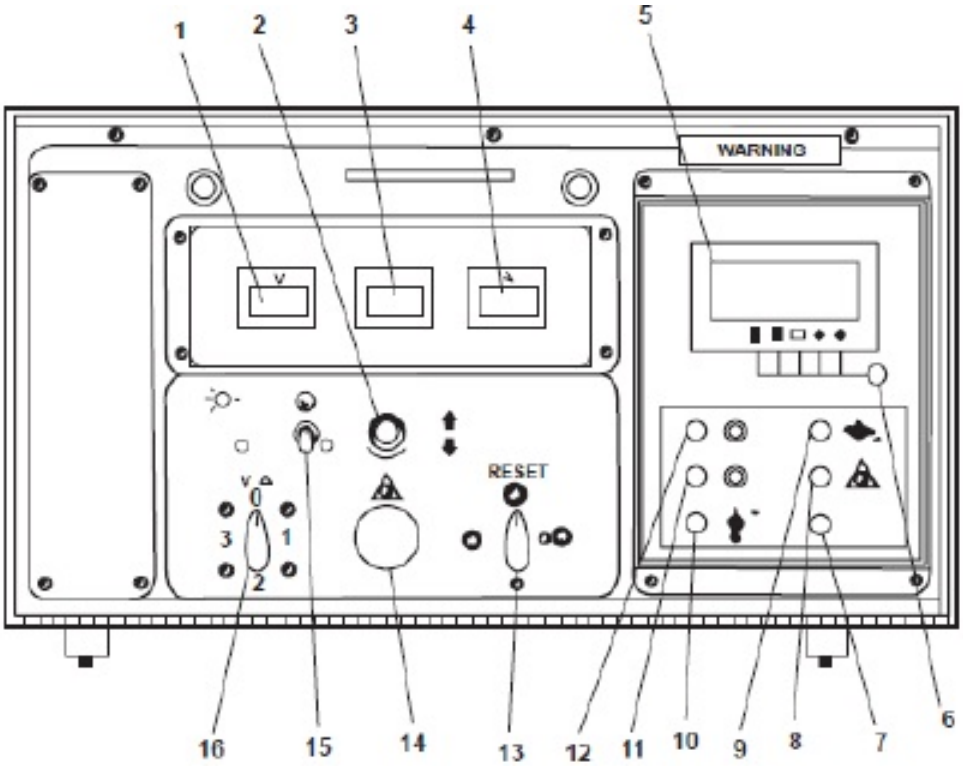
(a) Make sure the EDG is running and the breaker is closed.

(b) Verify that no power is fed to the main switchboard and that the shore power breakers are open.

(c) Insert the key and turn to the FEEDBACK position.

(d) Close the main bus tie breaker and either 1s/E or 2s/E breaker on the main switchboard.

(4) Refer to Figure 551-8ST-8115_05 and Figure 551-8ST-8115_06 for general EDG control functions.



Emergency Diesel Generator Control Panel, LT
Figure 551-8ST-8115_05

Key	Control/Indicator	Function
1	V Gauge	This gauge provides a digital readout of generator output voltage.
2	Voltage Adjust Rheostat	This rheostat adjusts the generator output voltage.
3	Hz Gauge	This gauge provides digital readout of generator output frequency in Hertz.
4	A Gauge	This gauge provides a digital readout of generator output current.
5	Engine Control Display	This display provides digital readout of various engine operating indicators.
6	Engine Control Display Pushbutton	This pushbutton scrolls through the various engine operating indicators displayed on the screen.
7	REVERSE POWER Indicator	This indicator illuminates to indicate a reversed power connection to the EDC.
8	EMERGENCY STOP Indicator	This indicator illuminates to indicate that an emergency stop has occurred.
9	LOW OIL PRESSURE Indicator	This indicator illuminates to indicate that low lube oil pressure in the EDC engine caused the emergency stop.
10	HIGH COOLANT TEMP Indicator	This indicator illuminates to indicate that high coolant temperature in the EDC engine caused the emergency stop.

EDG Control Panel Functions, LT
Figure 551-8ST-8115_06

Key	Control/Indicator	Function
11	OVERSPEED Indicator	This indicator illuminates to indicate that an overspeed condition caused the emergency stop.
12	OVERCRANK Indicator	This indicator illuminates to indicate that an overcrank condition caused the emergency stop.
13	Automatic Control Switch	This switch permits switching between OFF/RESET, AUTO, MAN, and STOP. In the OFF/RESET position, the control panel is reset after an emergency stop condition. In the AUTO position, the EDG will start automatically when normal vessel power is lost. In the MAN position, manual starting of the EDG may be accomplished. In the STOP position, the EDG will shut down despite the lack of normal vessel power.
14	Emergency Shutdown Pushbutton	This pushbutton is used to stop the EDG engine in case of an emergency.
15	Lamp/Display Test Switch	This switch is used to test the indicators and panel lights.
16	Ammeter/Voltmeter Phase Selector Switch	This switch selects the phase to display on the digital voltmeter and digital ammeter.

EDG Control Panel Functions, LT continued
Figure 551-8ST-8115_06

5. Shutdown the emergency generator.

a. Shutdown the emergency generator on the LSV.

(1) Place the emergency switchboard mode switch to the MAN position.

(2) Place the emergency generator circuit breaker switch to the momentary TRIP position. (The emergency generator circuit breaker will open and the emergency generator will stop.)

(3) Close the main switchboard bus tie circuit breaker (PO201). (The emergency switchboard is now energized by the main switchboard.)

(4) Place the emergency generator RUN-OFF-AUTO switch to AUTO, and ensure that the emergency stop PB switch is pulled out.

Note: The emergency system is now ready to energize the emergency switchboard of a main switchboard power failure.

b. Shutdown the emergency generator on the LCU.

(1) Place the EDG Mode switch to the manual position.

(2) Place the EDG Circuit Breaker switch to the momentary TRIP position. (This will open the EDG circuit breaker and the EDG will shutdown.)

(3) Close the Main Switchboard Bus Tie Circuit Breaker (PO201). This will allow the Main Switchboard to energize the emergency switch.

(4) Place the EDG Run-Off-Auto switch to Auto, and ensure that the Emergency Stop PB switch is pulled out.

(5) Place the Emergency Switchboard MODE switch to Auto.

Note: The Emergency System is now ready to energize the Emergency Switchboard in the case of a Main Switchboard and SSDG power failure.

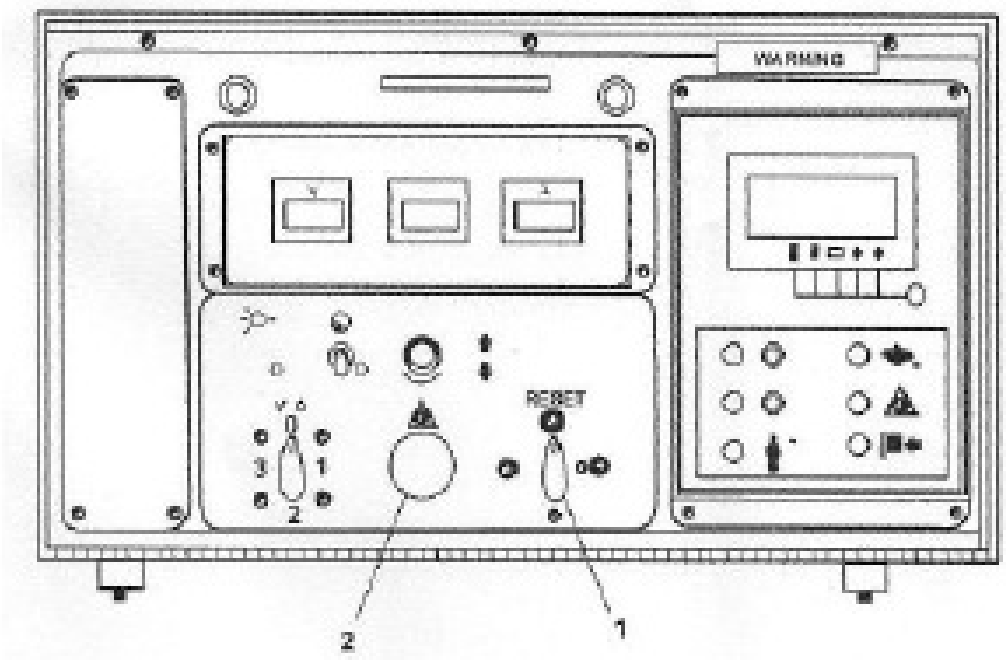
c. Shutdown the emergency diesel generator on the LT.

Note: Verify that all functions that use the emergency switchboard as backup are operating normally before running this procedure.

(1) At the emergency diesel generator control panel in the EDG room (Figure 551-8ST-8115_07), complete the following actions:

(a) Place the RESET control switch (Item 1) in the reset position.

(b) Place the red START/STOP pushbutton (Item 2) to the IN position to disconnect the starting circuit.



EDG Control Panel, LT
Figure 551-8ST-8115_07

(2) At the emergency switchboard in the EDG room (Figure 551-8ST-8115_08), complete the following actions:

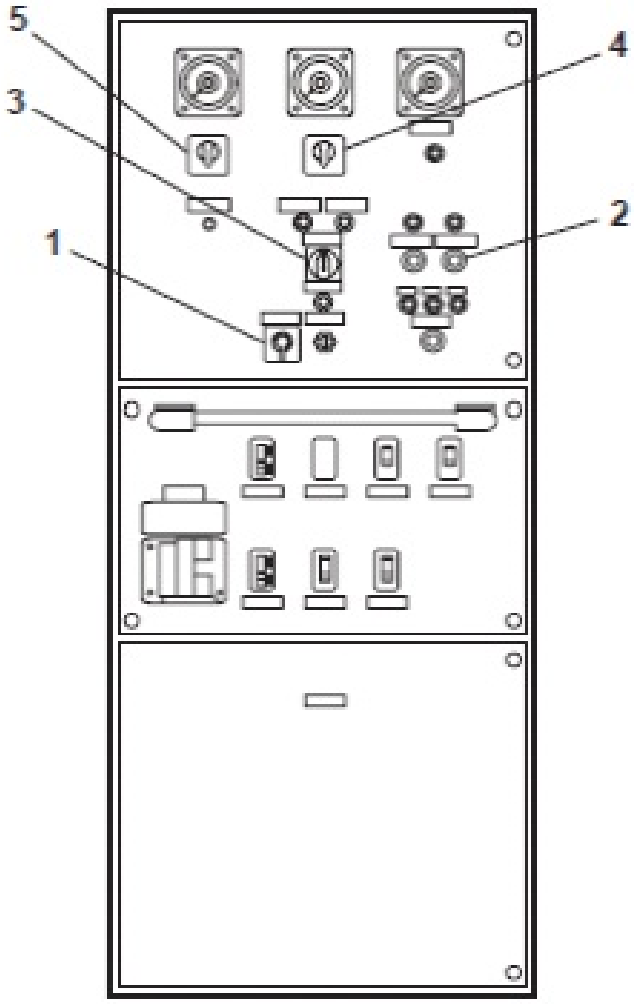
(a) Set the ENG. CONTROL SW. (Item 1) to OFF.

(b) Push the main switchboard bus-tie circuit breaker (Item 2) to the OPEN position.

(c) Set the ENG GENERATOR circuit breaker (Item 3) to OPEN.

(d) Set the AMMETER switch (Item 4) to OFF.

(e) Set the VOLTMETER switch 9Item 5) to OFF.

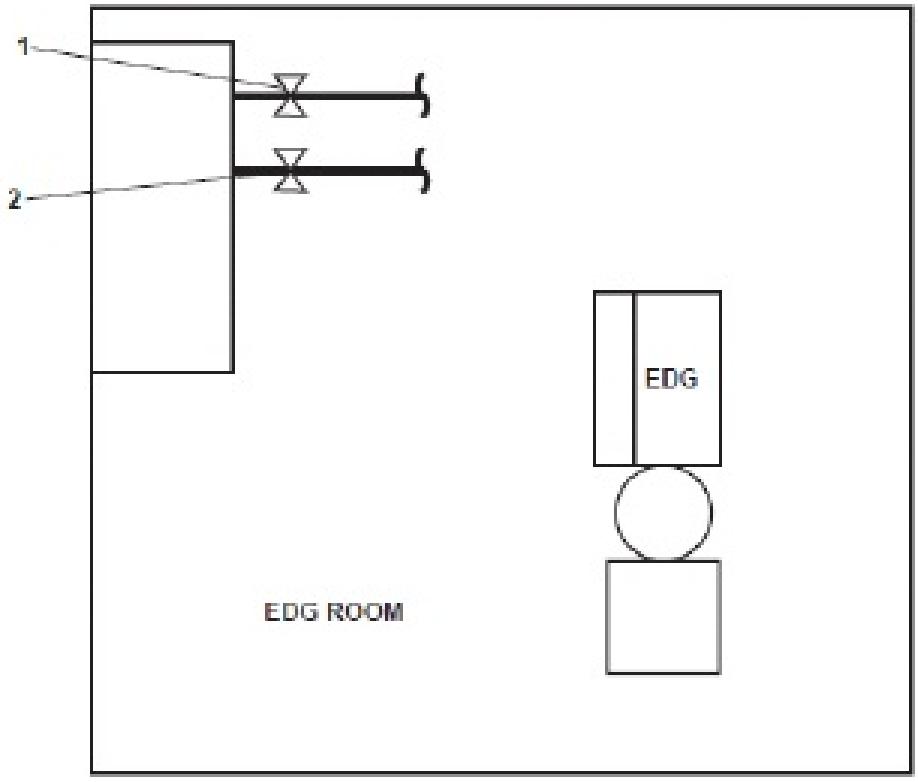


Emergency Switchboard, LT
Figure 551-8ST-8115_08

(3) Close the following valves located in the EDG room overhead (Figure 551-8ST-8115_09):

(a) FO-32, F.O. SPLY to ENG valve (Item 1)

(b) FO-12, E.D.G. DAY TK FILL valve (Item 2)



EDG Day Tank Valves
Figure 551-8ST-8115_09

6. Perform post-operation checks.

a. Inspect EDG starting batteries.

(1) Inspect the batteries, terminals, connections, cables, and vent caps for cleanliness and tightness.

(2) Clean or tighten terminals as required.

Note: Clean the terminals and posts with a mixture of baking soda and water. Keep battery caps installed to prevent baking soda and water mixture from getting into cell compartment of the batteries.

(3) Check the electrolyte level, specific gravity, and hydrometer. (It should read 1.265.)

b. Inspect the engine accessories and connections.

(1) Check the engine crankcase oil level on the dipstick. (The level should be between ADD and FULL.)

(2) Check the coolant level once it has cooled.

(3) Check the engine for any leaks of coolant, fuel, or oil.

(4) Verify that all switches on the engine and switchboard are back in the automatic positions.

(Asterisks indicates a leader performance step.)

Evaluation Preparation: Aboard an Army vessel with a fully mission capable emergency generator.

PERFORMANCE MEASURES	GO	NO-GO	N/A
1. Performed pre-operational checks.			
a. Inspected the emergency switchboard exterior for damage, or missing circuits, meters, controls, and lights.			
b. Inspected the battery charger for proper connections to batteries.			
c. Inspected the battery box for damage and verify that the vents are not obstructed.			
d. Inspected the emergency diesel generator (EDG) batteries.			
e. Inspected the fuel day tank.			
f. Inspected the engine accessories and connections.			
g. Inspected the load center for secure mounting and obvious damage.			
2. Aligned the emergency diesel generator for automatic or manual start (if applicable).			
3. Manually started the emergency generator if automatic start failed.			
4. Ran the emergency generator while adhering to warnings and cautions.			
5. Shutdown the emergency generator.			
6. Performed post-operation checks.			
a. Inspected EDG starting batteries.			
b. Inspected the engine accessories and connections.			

Supporting Reference(s):

Step Number	Reference ID	Reference Name	Required	Primary
	TM 55-1905-223-10	OPERATORS MANUAL FOR LANDING CRAFT, UTILITY (LCU 2000 CLASS) (NSN 1905-01-154-1191) (REPRINTED W/BASIC INCL C1-9)	No	No
	TM 55-1905-223-24-4	UNIT, INTERMEDIATE DIRECT SUPPORT AND INTERMEDIATE GENERAL SUPPORT MAINTENANCE INSTRUCTIONS FOR EMERGENCY GENERATOR SET FOR LANDING CRAFT UTILITY (LCU) (NSN 1905-01-154-1191) (REPRINTED W/BASIC INCL C1-4)	No	No
	TM 55-1915-200-10	OPERATORS MANUAL FOR LOGISTIC SUPPORT VESSEL (LSV) (NSN 1915-01-153-8801) (REPRINTED W/BASIC INCL C1-6)	No	No
	TM 55-1925-273-10-1	OPERATOR'S MANUAL FOR INLAND COASTAL LARGE TUG (LT)	No	No
	TM 55-1925-273-10-2	OPERATOR'S MANUAL FOR INLAND AND COASTAL LARGE TUG (LT)	No	No

Environment: None

Safety: In a training environment, leaders must perform a risk assessment in accordance with FM 5-19, Composite Risk Management. Leaders will complete a DA Form 7566 COMPOSITE RISK MANAGEMENT WORKSHEET during the planning and completion of each task and sub-task by assessing mission, enemy, terrain and weather, troops and support available-time available and civil considerations, (METT-TC). Note: During MOPP training, leaders must ensure personnel are monitored for potential heat injury. Local policies and procedures must be followed during times of increased heat category in order to avoid heat related injury. Consider the MOPP work/rest cycles and water replacement guidelines IAW FM 3-11.4, NBC Protection, FM 3-11.5, CBRN Decontamination.

Prerequisite Individual Tasks : None

Supporting Individual Tasks : None

Supported Individual Tasks : None

Supported Collective Tasks :

Task Number	Title	Proponent	Status
N/A	N/A	Not Selected	Obsolete